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Bozeman, Montana

MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow Forecasts as of October 1, 1982

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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BOZEMAN, MONTANA 59715
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THE MONTANA WATER SUPPLY OUTLOOK IS A PUBLICATION OF THE U.S. SOIL CONSERVATION SERVICE. THE SCS ADMINISTERS THE COOPERATIVE SNOW SURVEY PROGRAM IN COOPERATION WITH OTHER FEDERAL, STATE, AND PRIVATE AGENCIES, ORGNAIZATIONS, AND INDIVIDUALS.

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FEDERAL STATE PRIVATE
COOPERATIVE SNOW SURVEYS
furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro electric power generation, navigation mining and industry
"The Conservation of Water begins with the Snow Survey"

SUMMARY OF 1982 SEASON

The season started a little slow in some areas but by January 1, 1982, snow accumulation was near average over much of the state. The northwest and central areas were a little below average.

Storm activity increased during January with many areas showing nearly twice the snow water equivalent near February 1 as was measured a month earlier. Many valley floors also experienced a build-up of snow. The southwestern portion of the state had above average snowpack while the remaining area had near to a little above average snow accumulation by February 1. February was another good snowfall month in the mountains ith warm temperatures melting valley snow.

The southwest continued to report above average snowpack with near average in other areas. Some below average conditions were noted in central and south-central mountains. March snows were above average over most of the state's mountainous areas with much of the state showing above average snowpack near April 1. The central and south-central portions received additional snow but the season's accumulation remained below average.

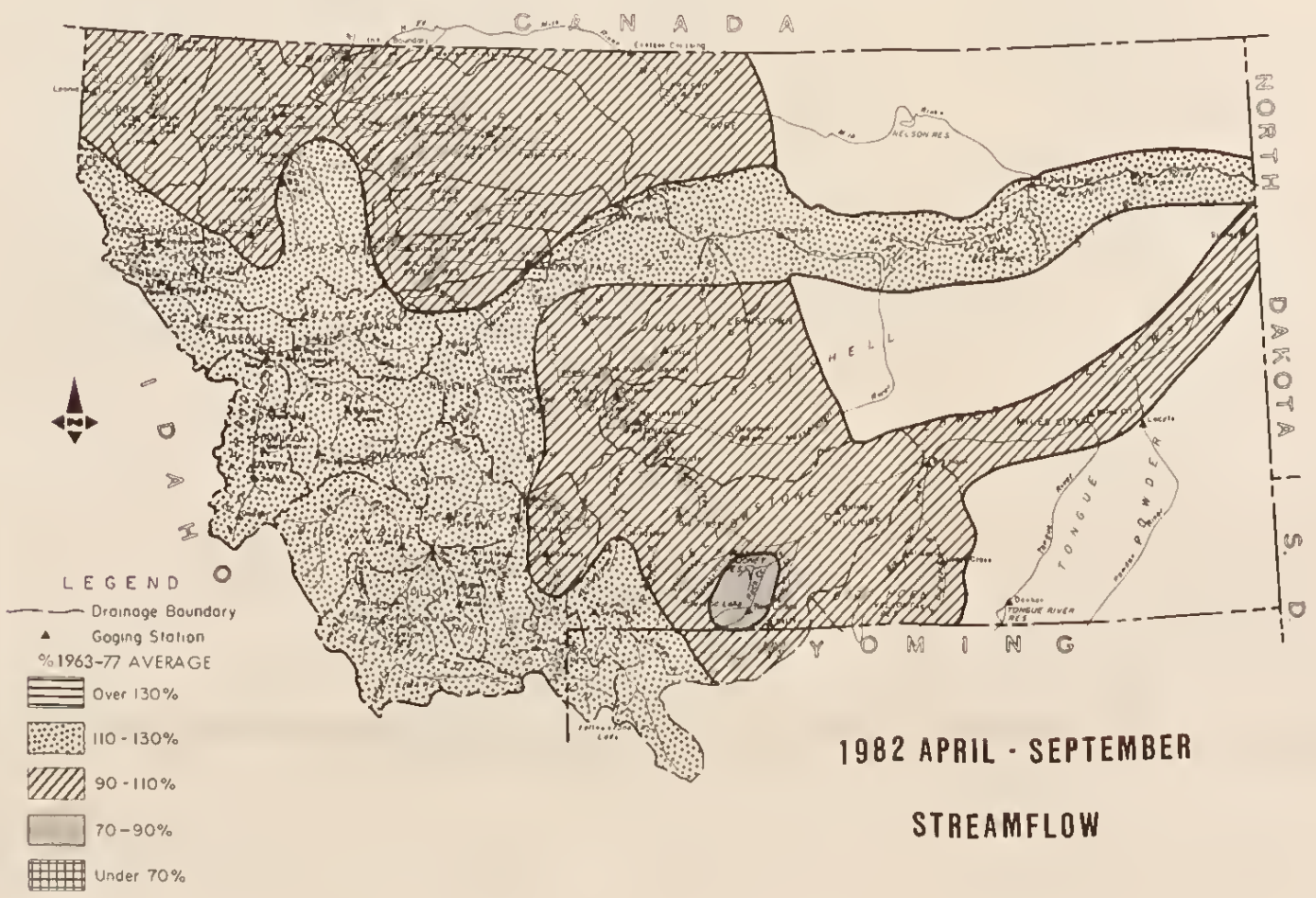
April was cool with very little snowmelt occurring until the end of the month. Snow in the lower elevations was well above average in most locations because of retarded melt and additional snowfall. Snowpack water content in middle and high elevations continued to increase through April.

Early May temperatures warmed but then turned cool while precipitation in the mountains continued to fall as snow. Some melt from lower elevations increased streamflows but the main snowmelt runoff was being delayed by cool temperatures.

After mid-May, temperatures warmed, snowmelt progressed at a reasonable rate, and streams were nearly full with snowmelt water by the end of May. Then winter returned to Montana, and one of the worst storms of the season paralyzed central Montana. The rest of the state received additional snowfall and cool temperatures stopped snowmelt.

June followed cool with very orderly but delayed snowmelt runoff occurring over most of the state. The Bitterroot River reached fairly high levels but damages were not major. By mid-July, temperatures finally warmed and plant growth was beginning to approach normal. August was generally warm and dry with residual snowpack and soil moisture providing adequate irrigation water in most areas.

Early September was warm but showers caused some interruption of harvesting. Late September saw a return of moisture to most areas which will help recharge soils for next season's runoff. In general, the year could be classified as unusual but a pretty good year for agriculture.



1982 APRIL - SEPTEMBER

STREAMFLOW

Based on provisional data provided by:
U.S. Geological Survey
Bureau of Reclamation
National Weather Service
Soil Conservation Service
Montana Power Company
and others

RESERVOIR STORAGE (Thousand Acre Feet) September 30, 1982 — Average based on 1963-77 period

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage: This Year	Usable Storage: Last Year	Usable Storage: Average
	COLUMBIA				
Kootenai	Koocanusa	5,748.2	5,693.0	5,606.0	---
Flathead	Hungry Horse	3,451.0	3,440.0	3,277.0	3,162.0
	Flathead Lake	1,791.0	1,655.0	1,725.0	1,740.0
	Camas (4)	45.2	28.3	19.2	17.5
	Mission Valley (8)	100.3	29.3	13.8	27.3
Clark Fork	Georgetown Lake	31.0	28.4	30.6	28.3
	Lower Willow Creek	4.9	1.7	0.6	1.0
	Nevada Creek	12.6	---	4.3	5.1
	Noxon Rapids	334.6	325.8	323.5	325.8
Bitterroot	Painted Rocks	31.7	---	---	22.7
	Como	34.9	---	---	2.5
	MISSOURI				
Beaverhead	Lima	84.0	37.5	11.6	34.6
	Clark Canyon	257.2	163.6	122.6	118.0
Ruby	Ruby	38.8	---	6.5	13.3
Madison	Hebgen Lake	377.5	324.8	341.2	338.0
	Ennis Lake	41.0	36.2	37.6	36.2
Gallatin	Middle Creek	8.0	4.4	2.9	3.0
Missouri	Canyon Ferry	2,043.0	1,802.0	1,644.0	1,767.0
	Hauser & Helena	61.9	51.8	63.0	58.2
	Lake Helena	10.4	10.7	10.9	10.5
	Holter Lake	81.9	81.0	81.4	77.6
	Fort Peck Lake	18,910.0	16,220.0	15,720.0	16,690.0
Smith	Smith River	10.6	---	4.6	5.6
	Newlan Creek	12.4	9.2	10.7	---
Musselshell	Bair	7.0	---	1.9	3.1
	Martinsdale	23.1	---	10.0	9.9
	Deadman's Basin	72.2	---	39.6	35.3
Sun	Gibson	99.1	37.1	18.6	30.2
	Willow Creek	32.2	22.4	21.9	19.0
	Pishkun	32.0	15.7	21.9	14.5
Marias	Lower Two Medicine	11.9	---	---	4.0
	Four Horns	19.2	---	---	11.1
	Swift	30.0	7.6	7.1	13.0
	Lake Frances	111.9	86.4	78.1	68.8
Milk	Elwell (Tiber)	1,347.0	668.0	526.2	601.7
	Beaver Creek	3.5	3.0	0.6	2.0
	Fresno	127.2	16.7	40.1	74.2
	Nelson	66.8	47.9	16.4	43.4
	HUDSON BAY				
St. Mary's	Lake Sherburne	64.3	21.6	4.6	7.4
	YELLOWSTONE				
Stillwater	Mystic Lake	21.0	19.2	18.5	19.3
Clark's Fork	Cooney	27.4	14.5	3.0	13.1
Tongue	Tongue River	68.0	---	21.3	27.0
Bighorn	Bighorn Lake	1,356.0	1,061.0	1,055.0	679.7

1982 SNOW COVER COMPARISONS - As A Percent of Average

	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1
COLUMBIA RIVER DRAINAGE					
Kootenai	77	88	106	109	123
Flathead	73	91	101	104	113
Upper Clark Fork	88	103	105	117	125
Lower Clark Fork	94	95	107	108	118
Bitterroot	112	122	122	122	130
MISSOURI RIVER DRAINAGE					
Jefferson	100	106	111	115	126
Madison	105	109	106	114	129
Gallatin	92	91	93	102	115
Missouri Main Stem	83	96	95	105	115
Judith-Musselshell	84	100	93	99	109
Marias-Teton-Sun	79	101	107	121	130
Milk	61	103	109	108	109
YELLOWSTONE RIVER DRAINAGE					
Yellowstone (above Bighorn)	90	89	96	100	107
Bighorn	--	111	88	103	102
Little Big Horn	--	76	60	79	70
Tongue	--	78	72	92	80
Powder	--	98	82	101	90
SASKATCHEWAN RIVER DRAINAGE					
St. Mary's	75	96	103	111	106

ACID PRECIPITATION STUDY CONTINUES

Current plans are to measure snowfall pH again this winter in conjunction with the manual snow course measurements. A report on last year's readings is being prepared and should be available later this fall.

Dr. Gordon Pagenkopf of Montana State University is continuing his research on chemical composition of snow samples collected last winter, how contaminants are released from the snowpack as it melts, and procedures for quantifying the susceptibility of lakes and streams to low levels of acidity.

Many federal and state agencies are collecting data that will help document baseline conditions and identify areas that may be impacted. However, most have very limited funds to support this project.

SNOTEL

Montana has 64 operational SNOTEL sites. Those with original electronics are reporting temperature, snow water equivalent and precipitation twice daily. The sites with newer electronics are reporting only once daily, but are providing minimum, maximum and average temperatures for the previous 24-hour period and midnight readings of snow water equivalent and precipitation in addition to current data.

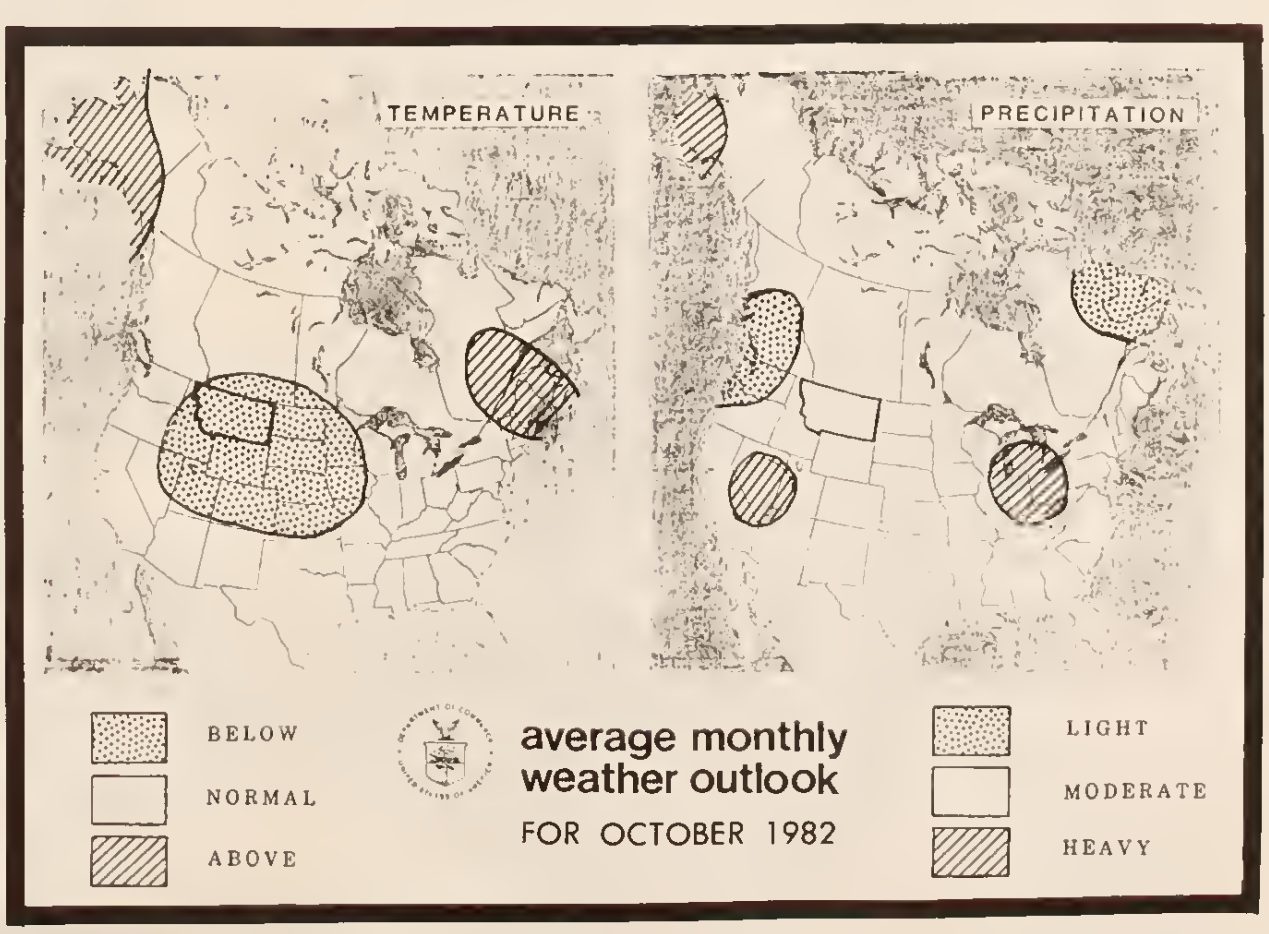
Water level, soil temperature and soil moisture sensors are also being added to some SNOTEL stations.

In addition to monitoring weather and estimating water equivalents at snow courses during periods between measurements, the data is being used by other agencies for flood prediction, avalanche warnings, and determining snowmelt rates and precipitation amounts occurring in remote areas.

Those having a need for real-time data for operational purposes should contact the Soil Conservation Service.

SNOW DATA SUMMARY DELAYED

The printing of annual snow survey data summaries is being delayed due to our conversion to a computer data base at Fort Collins and our decision on whether to publish annual summaries or update our present 1922-74 summary. We hope to proceed with one or the other in the near future. In the meantime, if you have needs for basic data from snow courses, let us know and we will try to accommodate your needs during this interim period.



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